

REMARKS

This amendment is in response to the Examiner's Office Action dated December 16, 2005. Reconsideration of this application is respectfully requested in view of the foregoing amendment and the remarks that follow.

STATUS OF CLAIMS

Claims 1-16 and 18-21 are pending, claims 2-5 and 13-18 having been amended, claim 17 cancelled without prejudice, and new claims 19-21 added hereby. No new matter is introduced.

The drawings and specification were objected to.

Claims 2-5, 13, 14, 17 and 18 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the invention.

Claims 13-18 stand rejected under 35 U.S.C. § 101 as directed to non-statutory subject matter.

Claims 1-4, 6-13, 16 and 17 stand rejected under 35 U.S.C. § 102(e) as being anticipated by *Odom et al* (US 6,516,320 B1).

Claims 5, 14 and 18 stand rejected under 35 U.S.C. § 103(a) as being obvious over *Odom et al* (US 6,516,320 B1) in view of *Harrington et al* (US 2001/0042058 A1).

Claim 15 stands rejected under 35 U.S.C. § 103(a) as being obvious over *Odom et al* (US 6,516,320 B1) in view of *Harrington et al* (US 2001/0042058 A1) and further in view of *Harrison* (GB 2 374 718 A).

OVERVIEW OF CLAIMED INVENTION

The present invention is a system and method for Content Addressable Storage (CAS) with a Logical Unit Number/Logical Block Address (LUN/LBA) interface. An LUN/LBA interface is utilized to obtain the benefits of the CAS interface without the necessity of re-writing applications that were designed to interact with the LUN/LBA to communicate with a CAS API instead.

The system of the present invention is comprised of three tiers. A first tier logic block is used to provide an LUN/LBA storage interface to application programs and to facilitate the writing and retrieval of reference data. A second tier logic block hashes reference data content to be written and stores a generated OID in a high-level OID table. A third tier logic block facilitates the writing of reference data to an LUN and the verification of the accuracy of reference data retrieved from a LUN. A second low-level OID table facilitates this process.

Access to an LUN/LBA storage area may be governed by the following access properties; a write-once property wherein the modification of an object results in the storage of a new object because content hashes will no longer match; a write-many property wherein multiple updates on a particular LUN/LBA are allowed; and lastly, a write-many with versioning property may be allowed wherein separate versions of a single object are chained together in an OID table.

Verification of the content of reference data occurs at the time of their retrieval. When an object is retrieved, its content is re-hashed and checked against a previously generated hash when the object was initially stored.

The present invention enables applications that were designed to access storage via Logical Unit Number/Logical Block Address (LUN/LBA) combinations to access Content Addressable Storage (CAS) in such a way that access to the storage is transparent to the application.

OBJECTIONS

The drawings were objected to. It is respectfully submitted that these objections be withdrawn.

Fig. 2 has been amended to correct the references to elements **210** and **212** and to correctly show OID and counter values in Table **206**. In addition, a replacement sheet is submitted herewith for Fig. 2. The specification has also been amended to remove all references to elements **300**, **400** and **500**, which are not shown in the drawings, but which were otherwise synonymous with Fig. 3, 4 and 5 respectively, when taken as a whole. No new matter is introduced thereby.

The specification was also objected to. It is respectfully submitted that this objection also be withdrawn.

¶ [0031] of the specification has been amended to be consonant with the drawings, i.e. to refer to step **318** rather than step **310**. No new matter is introduced thereby.

Please note that there is a discrepancy between the paragraph numbering in the Office Action and in the Image File Wrapper. Paragraph numbers in this amendment correspond to those in the Image File Wrapper.

REJECTIONS UNDER 35 USC §112

Claims 2-5, 13, 14, 17 and 18 were rejected under 35 U.S.C. § 112, ¶2 as being indefinite for failing to particularly point out and distinctly claim the invention.. This rejection is respectfully traversed.

The above claims have been amended to resolve antecedent basis issues, and are therefore not indefinite.

REJECTIONS UNDER 35 USC §101

Claims 13-18 were rejected under 35 U.S.C. § 101 as directed to non-statutory subject matter. This rejection is respectfully traversed.

The respective preambles of independent claims 13-16 have been amended to clarify that they refer to statutory subject matter.

Each of claims 13-18 is directed to a Content Addressable Storage (CAS) system, or to a subsystem thereof. CAS systems are a practical application in the technological arts

REJECTIONS UNDER 35 USC §102

Claims 1-4, 6-13, 16 and 17 were rejected under 35 U.S.C. § 102(e) as being anticipated by *Odom et al* (US 6,516,320 B1). This rejection is respectfully traversed.

Odom et al fails to teach or suggest the step of “*receiving an input/output (I/O) operation request, associated application-level LUN/LBA combination, and optionally, content data from an application program*” (*emphasis added*) as recited in claims 1 and 13 of the present application. Please note that although receiving content data is optional, receiving an *application-level LUN/LBA combination* is not, i.e. the receiving step in claims 1 and 13 does not recite these items in the alternative.

The Office Action identifies element **200** in FIG. 2 of *Odom et al* as providing the above limitation of claims 1 and 13, but the caption for element **200** merely reads “RECEIVE DATA OBJECT IDENTIFIER”.

FIG. 3, 4 and 5 of *Odom et al* show an example where *Odom et al*’s object identifiers comprise a value, pointers and/or a status component in relation to a linked list, as distinct from the LUN/LBA combinations of the present invention, and nowhere does *Odom et al* teach or suggest that an object identifier may be an LUN/LBA combination.

The Office Action further alleges that this limitation is taught in column 4, lines 24-27 of *Odom et al*, which in fact reads “FIG. 2 illustrates an access operation in accordance with one embodiment of the invention using the tiered structure of FIG. 1. Initially, a target data object is identified (block **200**)”. Nowhere in that passage, nor anywhere else in *Odom et al*, is there any mention of receiving anything that could be equivalent to an *application-level LUN/LBA combination*.

Claims 1 and 13, as well as claims 2-12 that depend from claim 1, are therefore allowable over *Odom et al.*

With regard to claim 16, *Odom et al* fails to teach or suggest “a first LUN/LBA processing tier configured to receive at least an *application level LUN/LBA combination* from an application” (*emphasis added*), for at least the reasons given above.

Claim 16, and claim 18 that depends therefrom, are therefore also allowable over *Odom et al.*

Claim 17 has been cancelled without prejudice, and so the rejection of claim 17 is moot.

REJECTIONS UNDER 35 USC §103

Claims 5, 14 and 18 were rejected under 35 U.S.C. § 103(a) as being obvious over *Odom et al* (US 6,516,320 B1) in view of *Harrington et al* (US 2001/0042058 A1). This rejection is respectfully traversed.

Claims 5 and 18 are dependent from claims 1 and 16 respectively, and claims 1 and 16 are allowable, hence claims 5 and 18 are also allowable.

With regard to claim 14, neither *Odom et al* nor *Harrington et al* teaches or suggests an OID processing tier “*receiving an application-level LUN/LBA address combination* and optionally, content data from either an application program or a first LUN/LBA processing tier” (*emphasis added*), whether taken separately or in combination.

The Office Action alleges that the same portions of *Odom et al* teach this limitation in relation to the second tier as were relied upon therein in relation to the first tier. However, as explained above, *Odom et al* fails to teach or suggest “*receiving an application-level LUN/LBA address combination*”. Moreover, neither is this deficiency supplied by *Harrington et al*, which relates to memory management. *Harrington et al* teaches allocating a predetermined number of

elements of memory for use by objects and teaches what is commonly referred to as ‘garbage collection’, i.e. automatically freeing memory resources, but does not teach or suggest an OID processing tier “*receiving an application-level LUN/LBA address combination and optionally, content data from either an application program or a first LUN/LBA processing tier*”.

Claim 14 is therefore also allowable over the combination of *Odom et al* and *Harrington et al*.

Claim 15 was rejected under 35 U.S.C. § 103(a) as being obvious over *Odom et al* (US 6,516,320 B1) in view of *Harrington et al* (US 2001/0042058 A1) and further in view of *Harrison* (GB 2 374 718 A). This rejection is respectfully traversed.

The Office Action fails to allege that any of the elements of claim 15 are taught or suggested by *Harrington et al* (US 2001/0042058 A1), hence the above rejection will be discussed only in relation to *Odom et al* (US 6,516,320 B1) and *Harrison* (GB 2 374 718 A).

The Office Action admits that *Odom et al* fails to teach or suggest either “re-hashing content data retrieved from an LUN/LBA combination if a retrieval request and an associated OID is received” or “comparing results of re-hashing step with an OID associated with said LUN/LBA combination stored in a low-level OID table”.

Harrison (GB 2 374 718 A) teaches data authentication using a data storage medium with a non-modifiable identifier and an appended identifier. A signature 25 is decrypted and compared to a hash of body data and a unique ID by using a public key. This differs greatly from the presently claimed steps of “re-hashing content data retrieved from an LUN/LBA combination if a retrieval request and an associated OID is received” and “comparing results of re-hashing step with an OID associated with said LUN/LBA combination stored in a low-level OID table”. More particularly, *Harrison* (GB 2 374 718 A) fails to teach or suggest “an OID associated with said LUN/LBA combination stored in a low-level OID table”.

Hence, none of the references relied upon in the Office Action, whether taken separately or in combination, teach all of the limitations of claim 15, which is therefore allowable.

SUMMARY

As has been detailed above, none of the references, cited or applied, provide for the specific claimed details of applicants' presently claimed invention, nor renders them obvious. It is believed that this case is in condition for allowance and reconsideration thereof and early issuance is respectfully requested.

As this amendment has been timely filed within the set period of response, no petition for extension of time or associated fee is required. However, the Commissioner is hereby authorized to charge any deficiencies in the fees provided to Deposit Account No. 09-0460.

If it is felt that an interview would expedite prosecution of this application, please do not hesitate to contact applicants' representative at the below number.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Alun L. Palmer", with a stylized, flowing script.

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March 16, 2006

AMENDMENTS TO THE DRAWINGS

Fig. 2 has been amended to correct the references to elements **210** and **212** and to correctly show OID and counter values in Table 206. A replacement sheet is submitted herewith.